Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended): A method for diagnosing ~~the~~ a possibility of disease in a body part, the method comprising:

representing the body part with a grid having a plurality of finite elements;

using a model of the body part to obtain a baseline electrical property associated with each of the plurality of finite elements for each of a plurality of current injections obtained with an electrode array;

calculating a set of weights associated with a particular one of the plurality of finite elements, the set of weights consisting of a plurality of weight factors wherein each of the plurality of weight factors is associated with each of the plurality of current injections and wherein each of the plurality of weight factors is determined based on current density in the particular one of the plurality of finite elements;

computing a diagnostic for the particular one of the plurality of finite elements, wherein the diagnostic is ~~the~~ a sum over all of the plurality of current injections of the plurality of weight factors multiplied by a ratio of the baseline electrical property to a measured electrical property; and

utilizing the diagnostic to diagnose the possibility of disease in a location in the body part associated with the particular one of the plurality of finite elements, wherein a higher value of the sum of the diagnostic represents a higher possibility of disease at the location.

2. (Previously canceled).

3. (Currently amended): The system of claim 1, wherein the measured electrical property is conditioned to compute the diagnostic.

4. (Previously canceled).

5. (Original): The method of claim 1, wherein, in the step of representing, the grid is a two dimensional grid.

6. (Original): The method of claim 1, wherein, in the step of representing, the grid is a three dimensional grid.

7. (Previously presented): The method of claim 1, wherein the baseline electrical property is obtained using a numerical model or a physical model of the body part.

8. (Previously presented): The method of claim 1, wherein the baseline electrical property is obtained using a control subject.

9. (Previously presented): The method of claim 1, wherein the baseline electrical property is obtained using a finite element method.

10. (Previously presented): The method of claim 9, wherein the baseline electrical property is a baseline impedance obtained by:

obtaining a baseline voltage; and

using the baseline voltage to compute the baseline impedance.

11. (Currently amended): The method of claim 10, wherein, in the step of using a model of the body part to obtain~~ing~~ a baseline electrical property, the model of the body part assumes a non-uniform resistivity.

12. (Currently amended): The method of claim 1, further comprising:

applying a plurality of electrodes to the body part; and

obtaining the measured electrical property of the body part with the electrode array ~~plurality of electrodes~~.

13. (Previously presented): The method of claim 1, wherein the measured electrical property is obtained by:

applying n_{CI} current injection electrode pairs on the body part, where n_{CI} is an integer greater than zero; and

applying n_{CI} voltage measurement electrode pairs on the body part,

wherein each of the current injection electrode pairs is associated with one of the n_{CI} voltage measurement electrode pairs.

14. (Currently amended): The method of claim 13, wherein the step of using a model of the body part to obtain~~ing~~ the measured electrical property includes:

injecting a first current between a first pair of the n_{CI} current injection electrode pairs;

measuring a resultant voltage difference V_1^M between a voltage measurement electrode pair associated with the first pair of the n_{CI} current injection electrode pairs;

repeating the preceding two steps of injecting and measuring with all other electrode pairs until n_{CI} voltage differences, $\{V_1^M, V_2^M, \ldots, V_{n_{CI}}^M\}$, are obtained; and

using the n_{CI} voltage differences to obtain associated measured impedances, $\{Z_1^M, Z_2^M, \ldots, Z_{n_{CI}}^M\}$, where Z_j^M is a measured impedance obtained by using a j^{th} current injection electrode pair and the voltage measurement electrode pair associated therewith.

15. (Previously presented): The method of claim 14, wherein if the particular one of the finite elements is identified as a k^{th} finite element and the set of weights is denoted by $\{w_{1k}, w_{2k}, \ldots, w_{n_{CI}k}\}$, where w_{ik} is a weight factor associated with the k^{th} finite element and i^{th} current injection electrode pair, then the step of calculating a set of weights includes:

using the model of the body part to obtain a set of current densities, $\{J_{1k}, J_{2k}, \ldots, J_{n_{CI}k}\}$, where J_{ik} is a current density at the k^{th} finite element when current is injected between the i^{th} current injection electrode pair; and

obtaining the set of weights using the relation

$$w_{ik} = \frac{J_{ik}}{\sum_{j=1}^{n_{CI}} J_{jk}}.$$

16. (Currently amended): The method of claim 15, wherein the step of using a model of the body part to obtain~~ing~~ a baseline electrical property includes:

using the model of the body part to obtain a set of baseline impedances $\{Z_1, Z_2, \ldots, Z_{n_{CI}}\}$, where Z_i is an impedance associated with the i^{th} current injection electrode pair.

17. (Previously presented): The method of claim 16, wherein the step of computing a diagnostic includes:

calculating an average of a function $f(Z_i, Z_i^M)$ at the k^{th} finite element, the average given by

$$\langle f_k \rangle = \sum_{i=1}^{n_{CI}} w_{ik} f(Z_i, Z_i^M),$$

wherein a diagnostic at the k^{th} finite element is defined to be $\langle f_k \rangle$.

18. (Original): The method of claim 17, wherein the function $f(Z_i, Z_i^M)$ is given by

$$f(Z_i, Z_i^M) = \frac{Z_i}{Z_i^M}.$$

19. (Previously presented): The method of claim 17, further comprising:

obtaining diagnostics at all finite elements, wherein the step of utilizing the diagnostic includes:

averaging the diagnostics at each of the plurality of finite elements to find an averaged diagnostic $\langle f \rangle$; and

calculating a second averaged diagnostic, $\langle f_{\text{homo}} \rangle$, corresponding to a homologous body part.

20. (Currently amended): The method of claim 19, wherein the step of utilizing the diagnostic further includes calculating a difference $\langle f \rangle$-$\langle f_{\text{homo}} \rangle$, wherein a quantity $|\langle f \rangle$-$\langle f_{\text{homo}} \rangle|$ is indicative of ~~a~~ the possibility of disease in the body part or the homologous body part.

21. (Currently amended): The method of claim 19, wherein the step of utilizing the diagnostic further includes calculating a quantity

$$\frac{\langle f \rangle - \langle f_{\text{homo}} \rangle}{\frac{1}{2}\left(\langle f \rangle + \langle f_{\text{homo}} \rangle\right)}$$

that is indicative of ~~a~~ the possibility of disease in the body part or the homologous body part.

Claims 22-42 (Canceled).